



MERLIN Collaboration Handbook

Päivi Parviainen – VTT
Joni Lehtomäki - Solid

Background

- Companies hardly develop embedded products completely on their own but the systems need to be developed:
 - In collaboration with subcontractors, third party developers and in-house development.
 - Globally distributed.
- The traditional single company development technologies do not support collaborative product development well, e.g.,
 - Time difference and geographical distribution cause new requirements to the ways of working and tools.
 - Understanding each other needs to be supported due to different backgrounds.

Merlin Handbook focus

- Product development organisations and projects that work in collaboration.
- Collaboration means that two or more entities work together to create mutual value.
 - Two or more companies, departments or even teams.
- The entities can combine in any one of several different business relationships and for very different periods of time;
 - Some duration needed to exploit a particular innovation or business opportunity, to a much longer term on-going relationship.
- The entities are physically in different locations, i.e., the development is distributed.

Merlin Handbook Purpose

- To structure items, questions and solutions as encountered in operational collaborative development
- To support evaluation if all important aspects have been taken into account during various phases of the collaborative project.
- To provide access to relevant solutions about collaboration and experiences of their use.
- To act as a user interface to access Merlin results.
- To provide views for subsets of items based on roles.
- To provide access to detailed information on request.

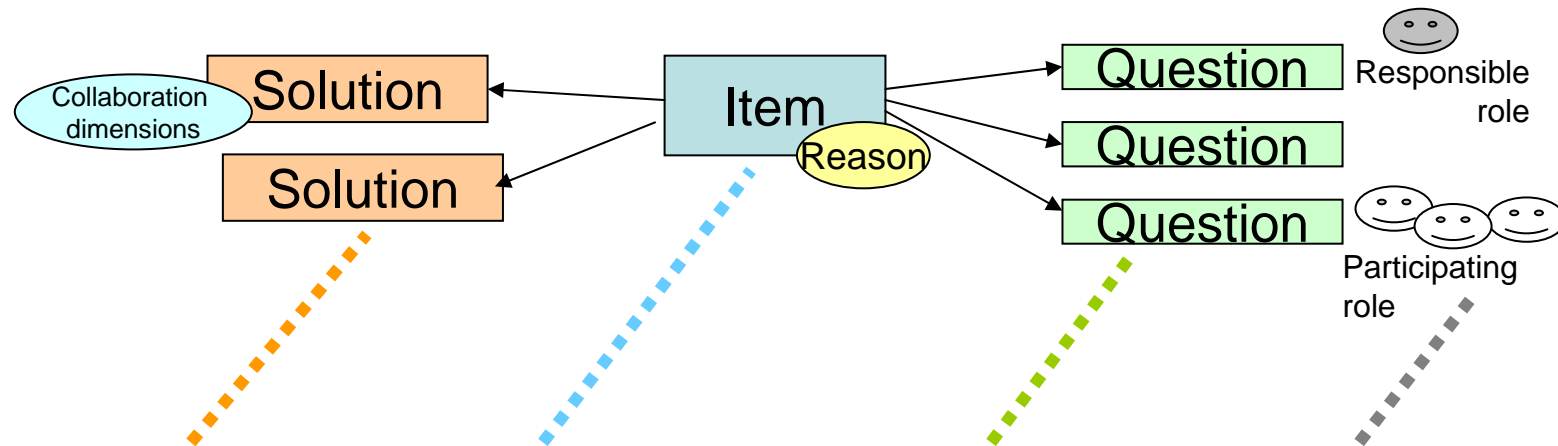
Merlin Handbook Development

- The handbook is not a physical book, but a structured documentation solution is used to support readability.
 - Protégé for editing the datamodel of the handbook (for Handbook administrator's use)
 - Supports RDF (Resource Description Framework) and OWL (Web Ontology Language), which are W3C recommendations for semantic web development
 - XML and HTML pages for browsing the handbook (for users of the Handbook)
- Handbook development
 - Initial framework derived from literature.
 - Industrial inventory based on the framework => refined framework.
 - Literature inventory to include solutions provided by others.
 - Bi-monthly workshops to refine implementation and contents of the handbook based on prototypes.
 - Collection of best practices from Merlin industrial partners as solutions and experiences related to them.
 - Adding solutions based on research work done and cases carried out during the Merlin project.
 - Validation of the Handbook by 14 external testers.

Handbook structure

- Topic (3 + 21)
 - Main topics: Management, engineering and support practices.
 - Topics: E.g., Collaboration management, requirements definition, testing, configuration management, co-operative work.
- Important items (79)
 - E.g., Product roadmapping, conditions for collaboration, practices for resolution of conflicting requirements, sharing of test cases, unified CM practices, cultural differences.
- Questions
 - E.g., Are supplier agreements and long-term framework agreements used as input for roadmapping?
- Roles
 - Responsible role.
 - Main participating roles.
- Solutions
 - Relating to an important item, e.g., supplier management plan, relating to collaboration management.
- Collaboration dimensions relevant to
 - Items and Solutions.

Handbook example



<p>Set of requirements analysis practices found useful in the reported cases.</p> <p>Guide for selection of suitable requirements management tools for current collaboration environment.</p>	<p>Clear requirements change management practices</p>	<p>Are change impact analysis practices defined and clear, including leveling of the analysis?</p> <p>Is change communication arranged and done in practice?</p> <p>Is the effort required for requirements change management prepared for?</p>	<p>Responsible: Project mgr</p> <p>Participating: Chief architect</p>
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Handbook contents

Management practices

- Collaboration strategy
- Contracts
- Collaboration management
- Project management
- Risk management
- Information management

Engineering practices

- Requirements development
- Requirements management
- Architecture design
- Software design
- Software implementation
- Integration
- Testing
- Release

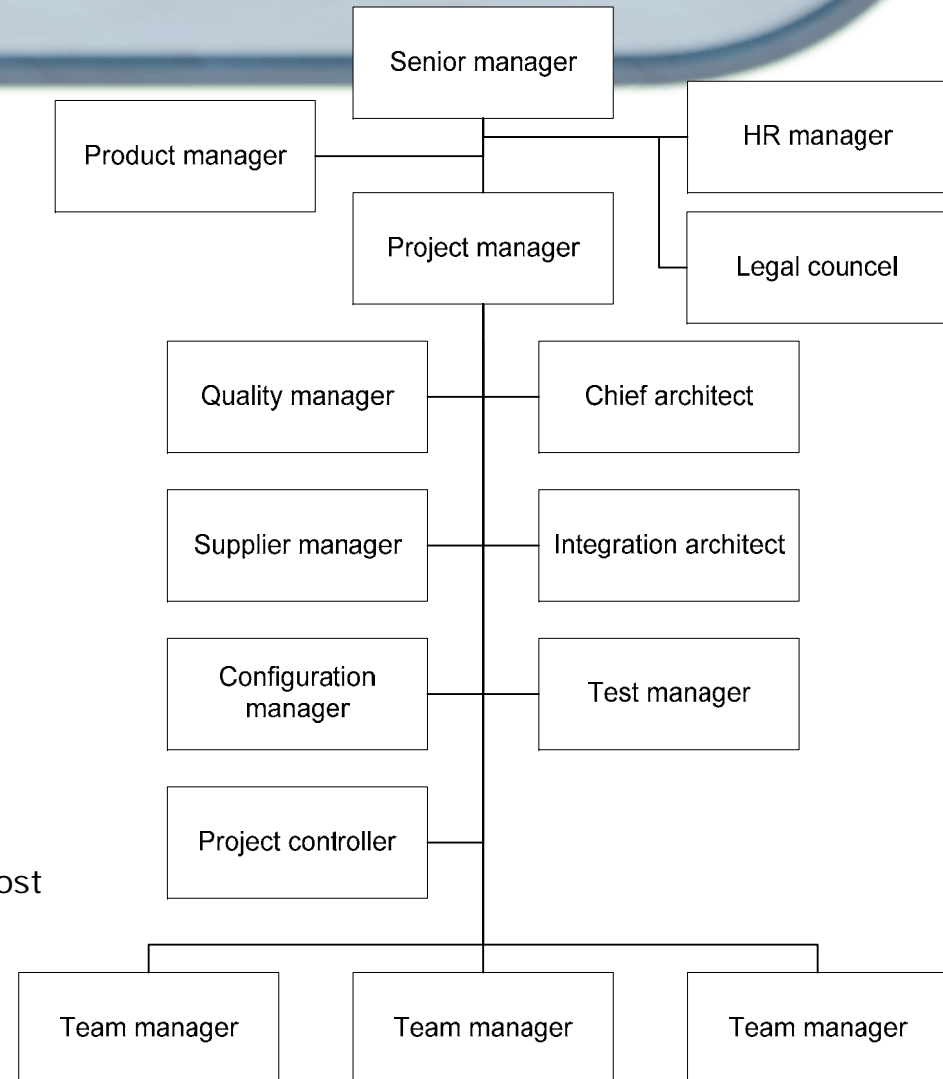
Support practices

- Configuration management
- Quality assurance
- Documentation
- Improvement process
- Human resource management
- Infrastructure
- Co-operative work

Topics	Example item	Example question
Collaboration strategy	Rewarding policy for collaboration efforts	Are the teams / individuals showing best practices in collaboration rewarded?
Information management	Communication of changes between different parties	Are there means and responsibilities for communicating changes and change proposals in collaborative development environment?
Requirements development	Common understanding about the requirements.	Is there continuous communication of requirements between parties?
Testing	Shared testing environment between partners	Are needs for shared test environment between partners identified and its availability ensured?
Co-operative work	Understanding each other	Is the learning curve prepared for and taken into account in the plans?

Roles

- Senior manager
- Project manager
- Team manager
- Chief architect
- Integration architect
- Quality manager (project related activities)
- Supplier manager
- Configuration manager
- Project controller
- Test manager
- HR manager
- Legal counsel
- Review moderator
- Note: Engineers are also involved in many things, but as it would be mentioned in almost every item, it is left out.



Handbook screenshot

[Home](#)
[My solutions](#)
[Scoping](#)
[Search](#)
[Propose new solution](#)
[Help](#)

- Management practices
 - Collaboration strategy
 - Contracts
 - Collaboration management
 - Project management
 - Explicit statement of project goals
 - Escalation channels
 - Managing critical resources
 - Status reporting practices
 - Clear change management practices
 - Alignment between teams and partners
 - Functional and purposeful project organization
 - Adequate communication mechanisms
 - Risk management
 - Information management
- Engineering practices
 - Requirements development
 - Requirements management
 - Architectural design
 - Software design
 - Software implementation
 - Integration
 - Testing
 - Release
- Support practices
 - Configuration management
 - Quality assurance
 - Documentation
 - Improvement process
 - Human resource management

ALIGNMENT BETWEEN TEAMS AND PARTNERS

To make clear to all partners the dependencies and to be able to analyse the full impact of delays of one task by one partner and making clear who is the customer of each team / partners work. Ensuring decision authority, communication and tracking of the progress between partners and to be clear where is the official up-to-date version of the documents, who's responsible of each document, etc To be able to react on and avoid potential problems pro-actively.

QUESTIONS TO BE ANSWERED

- Are the dependencies identified made explicit and managed between teams and taken into account in project schedule?
- Does each project task have clearly assigned responsible person?
- Are the acceptable tools and their versions defined for the whole project lifecycle?
- Is the project documentation defined between teams and partners including responsibilities owners sharing?
- Are procedures for dealing with deviations in alignment defined and communicated?
- Are responsibilities for delivery authority to accept and the acceptance procedure defined?
- Are pro-active tracking mechanisms of the status of the dependencies in place?

REPORTED SOLUTIONS

Following table lists the solutions, which are reported about the collaboration item. To be able to see the detailed description of a solution, click the solution name from the list.

Solution	Overview	Type	Evidence of suitability
Assigned responsibilities	The solution gives examples and advices for the kind of responsibilities that should be assigned in collaboration work.	Practice	Industrial case
Design tools selection criteria	Supports in selection of suitable design tools for collaborative project.	Practice	Industrial case
	Practices and proposal solutions for		

Solutions

- Solutions are methods, techniques, tools, and practices that help in taking care of important items.
- Solutions are classified according to their level of validation:
 - Academic case (solution proposed in literature, with academic case studies).
 - Industrial case (solution proposed in literature or developed in Merlin with industrial case studies).
 - Legislation or standards.
- Each solution has a standard description including:
 - ID, name, summary, description, evidence of suitability, type of solution, collaboration dimensions, and references to further information.

Solutions

- Few collaboration dimensions were chosen to characterize solutions applicability to various situations.

<p><u>Agreement base (Item, Solution)</u></p> <p><input type="checkbox"/> In-house <input type="checkbox"/> Subcontract</p> <p><input type="checkbox"/> Joint Agreement</p> <p><input type="checkbox"/> License-based</p>	<p><u>Number of partners (Item, Solution)</u></p> <p><input type="checkbox"/> 1 <input type="checkbox"/> 4-6</p> <p><input type="checkbox"/> 2-3 <input type="checkbox"/> 6-</p>	<p><u>Task coupling (Item, Solution)</u></p> <p><input type="checkbox"/> Independent <input type="checkbox"/> Tightly coupled</p> <p><input type="checkbox"/> Lightly coupled</p> <p><input type="checkbox"/> Medium coupled</p>
<p><u>Geographical distance (Item, Solution)</u></p> <p><input type="checkbox"/> Single site <input type="checkbox"/> 21-100 km <input type="checkbox"/> More than 2000 km</p> <p><input type="checkbox"/> 0-2 km <input type="checkbox"/> 101-500 km</p> <p><input type="checkbox"/> 3-20 km <input type="checkbox"/> 501-2000 km</p>	<p><u>Time difference (Item, Solution)</u></p> <p><input type="checkbox"/> 0-5 hours</p> <p><input type="checkbox"/> 5-12 hours</p> <p><input type="checkbox"/> More than 12 hours</p>	<p><u>Cultural differences (Item, Solution)</u></p> <p><input type="checkbox"/> All in same culture <input type="checkbox"/> Significantly different culture</p> <p><input type="checkbox"/> Slightly different cultures</p>

Handbook screenshot: solutions for alignment between teams and partners

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Assigned responsibilities	The solution gives examples and advices for the kind of responsibilities that should be assigned in collaboration work.	Practice	Industrial case
Design tools selection criteria	Supports in selection of suitable design tools for collaborative project.	Practice	Industrial case
Project infrastructure	Practices and proposal solutions for reducing problems derived from development tools and environments in collaborative work.	Practice	Industrial case
Reporting practices	Set of useful reporting practices.	Practice	Industrial case
Requirement management tools	Support in selection of suitable requirements management tools for current collaboration environment.	Tool	Industrial case, Academic case
Synchronization between partners	Guidelines for synchronisation between partners.	Practice	Industrial case

Solution examples

- Architecture design:
 - Description and references for several technologies for adaptive and reflective software architectures.
- Configuration management:
 - A set of configuration management practices found useful in the reported cases.
 - Guidelines for selecting CM tools.
- Co-operative work:
 - Set of practices found useful during project initiation.
 - Relationship building practices to build good cooperative relationship.
 - Cultural differences in working with India vs. western Europe.

Solutions summary

- All together 127 solutions have been described,
 - 8 were based on literature survey and SWOT analysis,
 - 41 were added based on literature later during the project,
 - 23 were developed during Merlin project by the Merlin partners,
 - 36 were based on Merlin partner experience, and
 - 19 were based on industrial cases carried out during the project.
- Most of the solutions are practices (103), but also 11 methods and 11 tools are described.
- All important items of the handbook are not completely covered by solutions as there was not enough time and effort available. Instead, the solution development was prioritized during the Merlin project in bi-monthly workshops involving all Merlin partners.

Solutions for management practices & items

Collaboration strategy	Models for collaboration	★★★★★ ★★★★
	Clear understanding of collaboration importance	★★
	Rewarding policy for collaboration efforts	★
	Product roadmapping	★★★★★
Contracts	Contracts coverage	★★★★★
	Effective contracting process	★
Collaboration management	Conditions for collaboration	★★★★★ ★★★★★
	Right level of confidentiality	★★★
	Defined supplier selection practices	★★★★★
	Detailed plan from supplier	★★★
	Clear agreements with suppliers	★★★★
	Clear roles, responsibilities and authorities	★★★
	Accurate tracking of partners / suppliers	★★★★★
	Explicit attention for managing the suppliers	★★★★
	Quality management	★★
	Explicit responsibilities and agreements about maintenance.	★

Project management	Explicit statement of project goals	★★
	Escalation channels	★
	Managing critical resources	★
	Status reporting practices	★★★★★ ★★
	Clear change management (related to project commitments) practices	★★★
	Alignment between teams / partners	★★★★★ ★★★★★ ★★★★★
	Functional and purposeful project organisation	★★★★★ ★★★
	Adequate communication means and information sharing.	★★★★★ ★★★★★
Risk management	Managing collaboration related risks	★★★★★
Information management	Defined and shared change management practices	★★★★
	Levelling of change requests	★★
	Communication of changes and problems between different parties	★★★★
	Assessing impact of change to parties work	★
	Agreement between partners how changes effect to contracts	★

Solutions for engineering practices & items

Requirements development	Clear and fixed requirements.	★★★★★ ★★★★★	Software design	Common design rules.	★★★★
	Involvement of right people in req analysis.	★★★★		Participation in design reviews.	-
	Common understanding about the requirements.	★★★★★ ★		Clearly specified interfaces	-
	Right level and enough involvement of all parties in validation of produced system reqs.	★★	Software implementation	Common implementation rules.	★★★★
	Practices for resolution of conflicting req	★★★		Defined and communicated integration strategy.	★★★★ ★
	Practices for identifying and dealing with ambiguous requirements.	★★★★	Testing	Shared test environment between partners.	★★★★ ★★
	Clear prioritization rules and practices / trade-off of the reqs in case of many interest groups.	★★★★★		Availability of needed expertise.	★★★★ ★
	Collecting feedback and discussing with customer.	★		Information about the performed tests and the test results.	★★★★
Requirements management	Consistency between requirements and further work products.	★★★★★		Sharing of test cases	★★★★
	Uniform RM practices between teams	★★★★★ ★	Release	Validating the product	★
	Clear requirements change management practices	★★★★★ ★		Acceptance testing	★
Architectural design	Development of the architecture by the right people	★★			
	Clearly defined maintenance and evolution of the architecture.	★★★★★ ★			
	Common / shared understanding of the architecture.	★★★★★			
	Taking into account the collaboration modes.	★★★			
	Enough communication about the architecture.	★★			

Solutions for support practices & items

Configuration management	Traceability of release information for maintenance reasons.	★★	Human resource management	Social and communicative skills of project leaders	★
	Unified CM practices and common understanding about CM for partners.	★★★★		Awareness of needed competence	★★★
	Early installed tool support.	★	Infrastructure	Sufficient tools for communication	★★★★
	Release management	★		Accessibility of service levels	-
Quality assurance	Common practices	★★★★★ ★★★		Availability / usability of tools	★★★★★ ★★
	In-house reviews	-		Shared repositories	★★★★
Documentation	Documents sharing	★★★★★ ★★		Access to all needed corporate resources to all that need them.	★★★
	Documentation practices	★★★		Compatibility of development tools and environments between partners.	★★★★
Improvement process	Evaluating the effectiveness of collaboration.	★★★★		Time difference	★★★★
	Shared process improvement work in long term relationships.	★	Co-operative work	Cultural differences	★★★★★ ★
	Common process for relevant items across sites / partners.	★★		Understanding each other	★★★★★ ★★★★

- Thank you for your attention!
- Questions?